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CASE REPORT

Hyperdense renal vein: a sign of acute thrombosis

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Introduction

A 33-year-old female from Zaire (resident in the UK since 1998) presented with a 4 day history of right-sided abdominal pain, fever, nausea and vomiting. She was known to have sickle cell trait, as well as systemic lupus erythematosus. She had developed nephrotic syndrome during pregnancy 19 months earlier. Examination revealed a tender right renal angle.

Routine laboratory data included albumin 16 g/l, haemoglobin 11.4 g/dl, white blood cell count 14.5×10^9/l, red cell count 4.97×10^{12}/l, urea 8 mmol/l, creatinine 148 mmol/l, DNA antibody 392 (raised) and a reduced complement profile. Twenty-four hour urine collection revealed a proteinuria value of 14.94 g/24 h and a creatinine clearance of 50 ml/min.

Abdominal ultrasound showed a swollen and enlarged right kidney measuring 13.8 cm. There was no evidence of dilatation of the pelvicalyceal system, but the overall echogenicity of the right kidney was increased. The left kidney was normal. It was decided to perform Doppler ultrasound to confirm or exclude renal vein thrombosis.

At the repeat ultrasound performed 48 h later, the right kidney was not well visualized and venous Doppler flow signal could not be reliably obtained at the renal hilum. Venous signal was, however, present within the kidney. The renal sinus was noted to be hypoechoic, and as there was now increased suspicion of a renal vein thrombosis, CT was performed to confirm this and exclude early hydronephrosis. Unenhanced CT revealed a hyperdense renal sinus on the right (Fig. 1) while the enhanced image confirmed the presence of a thrombus in the right renal vein, extending into the inferior vena cava (Fig. 2).

Of note was that the patient was well hydrated before the procedure and there was no deterioration in renal function after the administration of contrast media as judged by a persistently stable serum urea and creatinine level.

Discussion

Although renal vein thrombosis is a well-recognized complication of nephrotic syndrome,[1,2] establishing the diagnosis is sometimes difficult because its presentation varies. It is commonly asymptomatic when complicating nephrotic syndrome and it has been suggested that this is the case in up to 40% of cases.[3] Patients are increasingly being treated with thrombolysis[4] or anticoagulation and as there are many associated risks, it is essential to ensure that the diagnosis is confidently established before commencing treatment.

Until recently, conventional selective renal venography has been the standard for establishing the diagnosis of renal vein thrombosis.[5] However, renal venography is invasive, uses potentially nephrotoxic contrast medium and carries the risk of vascular injury, clot formation and bleeding. Furthermore, it is inappropriate as a screening examination in the asymptomatic patient with nephrotic syndrome. This has lead to the increasing popularity of less invasive examinations such as Doppler ultrasound, CT and magnetic resonance imaging/angiography (MRI/MRA).[15]

Non-specific ultrasonographic findings of renal vein thrombosis are increased renal size, altered echogenicity, loss of corticomedullary differentiation and enlargement of the renal vein.[6,7] The specific findings are the absence of Doppler signal flow within a well-demarcated renal vein. However, it has been reported that it is often difficult to directly detect clots in the renal vein.[7] Furthermore, a distended renal vein containing low

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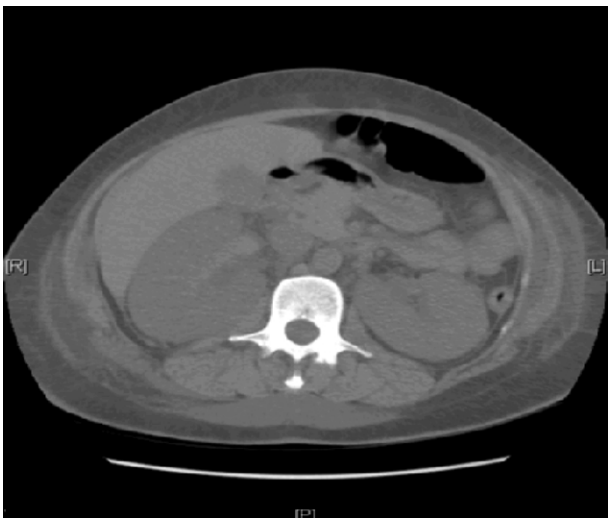

Figure 1 The unenhanced CT showing a right renal vein thrombus.

echogenic thrombus may mimic early hydronephrosis.

The indirect CT manifestations of acute renal vein thrombosis are renal enlargement, renal vein enlargement, vascular collaterals and prolonged corticomedullary enhancement junction time.[8,10] Direct CT manifestations of acute renal vein thrombosis are visualization of low-attenuation thrombus (filling defect) in the vein after the administration of contrast. The differentials for a high-attenuation focus in the renal hilum on an unenhanced image includes haemorrhage into a parapelvic cyst[11] and primary or secondary solid tumours.[12,13] Unenhanced CT of portal veins containing high attenuation indicate recent portal vein thrombosis.[9]

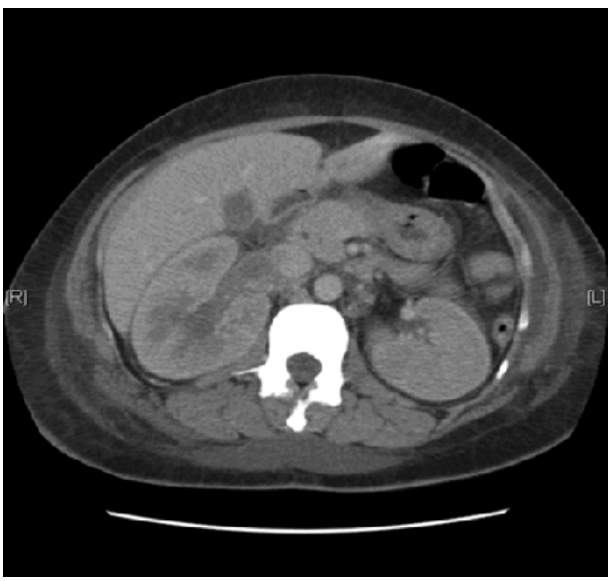

Figure 2 Enhanced CT can obtained after injection with contrast medium, confirming a right renal vein thrombus.

In the present case the presence of fresh thrombus within the renal vein can be clearly identified on the unenhanced image. We were able to locate a single case report of this finding in a patient with a gastric carcinoma,[14] however, we believe that it is an important observation that deserves greater recognition.

In conclusion, the following points are worth stressing:[1] although unenhanced CT is usually considered non-contributory in the diagnosis of venous thrombosis, fresh renal vein thrombus may be detected as hyperdensity in the renal vein. Such a finding obviates the need for contrast to be administered.[2] Care should be taken when interpreting ultrasound images of the kidneys as renal vein thrombus can quite easily be mistaken for an early hydronephrosis.

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